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A REVISION OF *FONTAINEA* HECKEL (EUPHORBIACEAE - CLUYTIEAE)

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Summary

The genus *Fontainea* Heckel is reviewed and four species, *F. australis, F. oraria, F. rostrata* and *F. venosa*, are described as new for Australia. *F. pancheri* (Baillon) Heckel is confined to New Caledonia and is deleted from the flora of Australia and New Guinea.

The genus *Fontainea* Heckel is presently known to occur in Australia, New Guinea, New Caledonia and Vanuatu (New Hebrides). Heckel (1870) circumscribed the genus as having one species, *F. pancheri* (Baillon) Heckel. Australian material of *Fontainea* was referred to this species by Bentham (1873) and Bailey (1902). C.T. White (1933) described a second species (*F. picrosperma*) from north-east Queensland and recently Airy Shaw (1974, 1980a, 1980b) has reviewed the genus in Australia and New Guinea. Airy Shaw placed the New Guinea and south-east Queensland specimens under *F. pancheri* although suggesting that ". . . they show small differences among themselves and could perhaps deserve varietal recognition . . . but probably not specifically distinct".

Our interest in this genus arose when in July 1981 we collected from north-east New South Wales a rainforest specimen of a species unknown to us. We later confirmed that it was from a species of *Fontainea* new to science. Subsequent collecting and examination of existing herbarium material showed that the genus was in need of a critical review. Four new species from eastern Australia are recognised as a result of this study. They are clearly distinct from *F. pancheri* under which Australian specimens of two of them (*F. rostrata* and *F. venosa*) were previously placed. The other two species, *F. australia* and *F. oraria*, are known only from our collections made during the study.

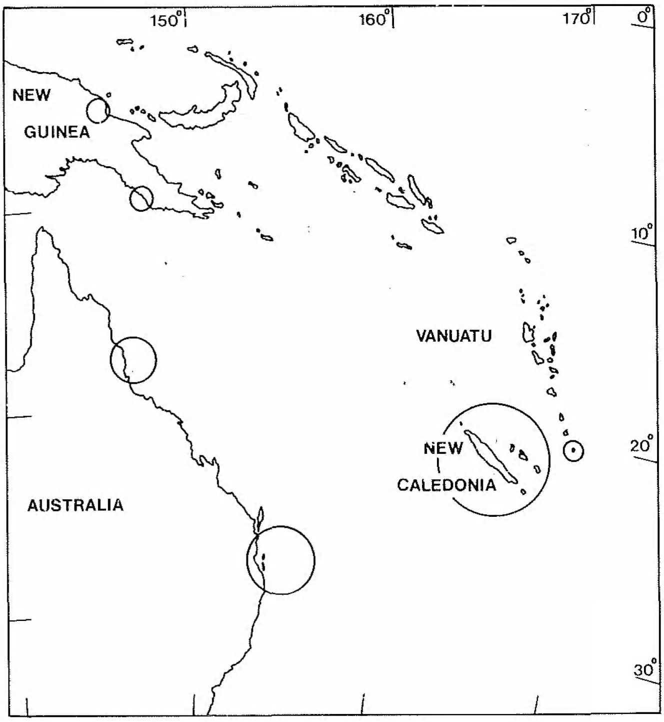
Although living plants of most species were studied, the leaf descriptions are based on dried material. Floral and fruit measurements given in the key and the descriptions are based on material preserved in spirit. Inflorescence terminology follows that of Briggs and Johnson (1979), leaf terminology follows that of Hickey (1973) and ecological terminology follows that of Webb (1978).

FONTAINEA

Fontainea Heckel, Étude au point de vue botanique et thérapeutique sur le *Fontainea pancheri* (nobis), pp. 9 & 10 (1870). Thése Faculté de Medecine de Montpellier. **Type:** *Fontainea pancheri* (Baillon) Heckel, based on *Baloghia pancheri* Baillon.

Dioecious or rarely monoecious shrubs or trees with watery, reddish, brownish or orange bark exudate. Leaves simple, spirally arranged, entire. Crystal-idioblasts in mesophyll visible as translucent dots and pustules on adaxial surface. Petiole sometimes geniculate at base and apex. Glands 2, sometimes 1 or absent, at base of lamina or at junction with petiole, mostly flat, sometimes raised and marginal. Stipules minute or obsolete. Inflorescence anthotelic, sometimes the median flowers aborted, terminal and/or axillary through failure of apical bud, variously reduced from metabotryoids to monads, most frequently botryoid, sometimes sciadoid. Prophylls, metaxyphylls and pherophylls alternate, subopposite or pseudowhorled. Anthopodia variable, sometimes articulate, rarely much reduced or absent. Calyx shallowly 4–6-lobed, cupuliform, irregularly splitting from 2 or more sinuses to near base at anthesis. Petals 4–6, free, imbricate in bud. Disc annular, fleshy. Male flowers: stamens 18–32; filaments outwardly curved, basally connate and appearing as a densely pilose, convex receptacle; anthers dorsifixed extrorse. Female flowers: ovary (2–)3–5-locular with 1 ovule per locule, glabrous or villous. Styles basally connate; stigmas as many as locules, deeply bilobed, ± spreading, verrucate-colliculate and red-brown above, ± appressed pubescent below towards style. Fruit drupaceous; sarcocarp ± fleshy; endocarp bony with a central basal foramen and (2–)3–5 longitudinal sutures usually confluent with longitudinal ridges which correspond to the original locules of the ovary; 1-locular and 1-seeded due to expansion of 1 ovule, the others crushed against inner wall of endocarp. Intersutural faces of endocarp ridged, grooved, textured or smooth, each with a subapical foramen and sometimes scattered vascular foramina. Seed with membranous testa and abundant endosperm; cotyledons broad, flat. Germination by splitting at longitudinal sutures, phanerocotylar.

The genus consists of six species, of which five are endemic in eastern Australia and one is endemic in New Caledonia. Four additional taxa, one from Papua New Guinea and three from New Caledonia and Vanuatu, are insufficently known to us for taxonomic placement. The known distribution of the genus is given in Map 1.



Map 1. Distribution of *Fontainea*.

Key to Species

1. Ovary glabrous; endocarp with scattered vascular foramina as well as basal and subapical foramina 2
   Ovary villous; endocarp with only a central basal foramen and 2-5 subapical foramina 3

2. Endocarp ridged; scattered foramina numerous, ± conspicuous. New Caledonia .... **(6) F. pancheri**
   Endocarp subglobular or obtusely (3-) 4- or 5- angular; scattered foramina few, inconspicuous. SE Qld .... **(5) F. venosa**

3. Disc of male flower *c.* 0.3 mm high; filaments connate to 2 mm above top of disc. Base of lamina attenuate and ± decurrent with petiole; petiole not geniculate or swollen at apex. Endocarp with a 2–3 mm long apical beak. SE Qld .... (1) **F. rostrata**
   Disc of male flower 0.8–1.2 mm high, filaments connate 0.4–1 mm above top of disc. Base of lamina cuneate; petiole swollen and ± geniculate at apex. Endocarp not prominently beaked 4

4. Endocarp (4–)5-ridged. Leaves appressed pilose along midvein on underside. NE Qld .... (2) **F. picrosperma**
   Endocarp (2–)3-ridged. Leaves glabrous. NE N.S.W. 5

5. Endocarp smooth, not grooved on intersutural faces. Female floral axes 15–22 mm long; male floral axes 7–12 mm long. Basilaminar glands 5–22 mm above base of lamina .... (3) **F. australis**
   Endocarp rugose and medially grooved on intersutural faces. Female floral axes 8–10 mm long; male floral axes 5–6 mm long. Basilaminar glands 0.5–4 mm above base of lamina. .... (4) **F. oraria**

1. **Fontainea rostrata** Jessup & Guymer, **sp. nov.**

Frutex vel arbor usque 7 m alta. Folia obovata vel oblanceolata, acuminata vel obtusa. Glandes laminarum planae, ellipticae vel oblongae, submarginales vel inter marginem et midvenum ± mediae, c. 2–5 mm supra basin. Ovarium villosum. Fructus sarcocarpo molliter carnoso, 5–10 mm crasso, rubro praeditus. Endocarpus 3-4-sulcatus secus suturas; superfices intersuturales rugosae, ± planae ubi endocarpus 3-angulatus, concavae ubi endocarpus 4-angulatus, 20–23 mm longae, 12–13 mm latae, porca mediana plerumque extensa ultra foraminem subapiculem et elevata supra id instructae. **Typus:** S.F. 502, Veteran L.A., *c.* 15 km N of Gympie, 7 Jan 1983, *Guymer* 1842 *& Jessup* (♀) (BRI, holo; A. BRI, CANB, K, L, MEL, NSW, iso).

Shrub or tree to 7 m. Innovations appressed pubescent, glabrescent. Leaves obovate or oblanceolate, acuminate or obtuse, chartaceous; lamina (2.5–)6–9(–13) cm long, (1–)2.5–4(–5.6) cm wide, glabrous; base attenuate and ± decurrent with petiole; secondary veins 6–8 pairs with intersecondaries nearly as prominent; tertiary venation reticulate. Basilaminar glands flat, elliptic or oblong, submarginal or ± midway between margin and midvein, *c.* 2–5 mm above base of lamina. Petiole slightly swollen at base, shallowly channeled above, 3–13 mm long. Male inflorescence a terminal or axillary botryoid or partially or wholly reduced to a metaxymonad. Floral axes articulate or not, 1–12 mm long, prophylls vestigal or absent. Metaxyphylls caducous. Buds subglobular. Calyx 4–6-partite, appressed pubescent outside, glabrous inside. Petals (4–)5(–6), ovate or narrowly ovate, ± recurved, 4–7 mm long, 2.8–3.8 mm wide, shortly velutinous or sericeous outside, velutinous inside. Disc inconspicuous, *c.* 0.3 mm high, 2.4 mm diam, with shallow, narrow, irregular slits, glabrous. Stamens 28–32, connate to 2 mm above top of disc; free portion of filaments 2.5–3 mm long, apically glabrous, basally villous. Female inflorescence a botryoid often reduced to 3 or fewer flowers. Prophylls present or absent. Metaxyphylls sometimes present on main axis. Anthopodia sometimes absent, the prophylls partly fused to hypanthium. Floral axes not articulate, 5.5–12 mm long, puberulous. Buds ovoid. Calyx 4–6-partite, appressed pubescent outside, glabrous inside, often later detaching from base of flower as a ring. Petals oblong, 7–8 mm long and 3–4 mm wide, appressed pubescent outside, villous inside at base grading to velutinous towards apex. Disc *c.* 0.4 mm high, 2.5 mm diam., ± irregularly crenulate, pilose. Ovary ovoid, 3-(4)-locular, densely villous with antrorse hairs. Styles *c.* 0.5 mm long. Fruit subglobular or depressed globular, 27–30 mm long, 25–30 mm wide; sarcocarp puberulous, shallowly 3- or 4-grooved, soft-fleshy, 5–10 mm thick, red; endocarp 3- or 4-ridged at sutures; intersutural faces rugose, ± flat if 3-angled, concave if 4-angled, 20–23 mm long, 12–13 mm wide, with a median ridge that usually extends and is raised over the subapical foramen. **Fig. 1.**

Queensland. WIDE BAY DISTRICT: S.F. 502 Home L.A., *c.* 18 km N of Gympie, 7 Jan 1983, *Guymer* 1840 *& Jessup* (♀) (A, BRI, NE, NOU, QRS); S.F. 502 Veteran L.A., *c.* 15 km NNE of Gympie, 7 Jan 1983, *Guymer* 1842 *& Jessup* (♀) (A, BRI, CANB, K, L, MEL, NSW); *Guymer* 1843 *& Jessup* (♂) (A, BRI, CANB, K, L, MEL, NE, NOU, NSW, QRS), 6 Jan 1982, *Haines* (♀) (BRI, CANB), 4 Feb 1982, *Haines* (♀) (BRI), 29 Nov 1973, *Henderson* (♀) (♂) (BRI), 10 May 1977, *Henderson* (♀) (BRI); Gympie, in 1906, *Kenny* (♀) (BRI).

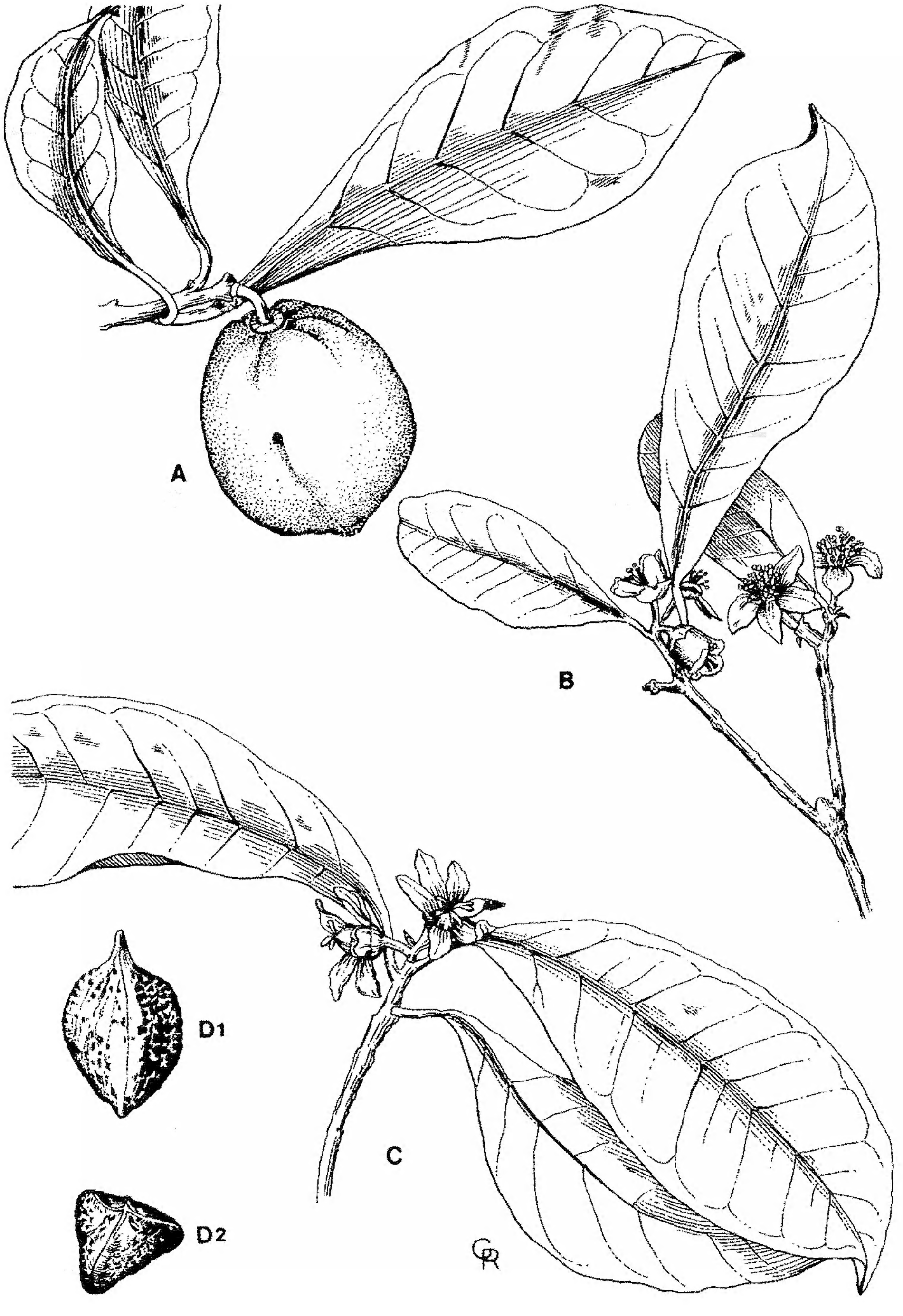


Fig. 1. *Fontainea rostrata*: A. habit with fruit (*Haines*, 4 Feb 1982) x 1. B. habit with male flowers (*Guymer* 1843 & *Jessup*) x 1. C. habit with female flowers (*Guymer* 1842 & *Jessup*) x 1. D. endocarp; D1, side view; D2, apical view (*Haines*, 4 Feb 1982) x 1.

Habitat: It is known only from a few localities in the Gympie district in notophyll vine forest on soil derived from metamorphic rocks. **Map 2.**

This species differs from *F. venosa* and *F. pancheri* by the villous ovary and from all other species by the prominently beaked endocarp and non-geniculate petiole.

2. Fontainea picrosperma C. White, Contrib, Arn. Arbor. 4:55 (1933). **Type**: Boonjie, Atherton Tableland, 9 Oct. 1929, *S.F. Kajewski* 1262 (holo: BRI, iso: A).

Tree to 25 m. Innovations sericeous. Leaves oblanceolate, narrowly obovate or elliptic, acuminate, chartaceous; lamina (4–)7–15(–19) cm long, (1–)2–5(–6) cm wide, glabrescent or glabrous except for adpressed pilose veins on undersurface; base obtusely cuneate or rounded; secondary veins mostly 8–12 pairs; tertiary and higher order venation reticulate. Basilaminar glands on underside, marginal, raised, 1.5–5 mm from base of lamina. Petiole 10–40 mm long, mostly flat on upper surface sometimes with lateral ridges, slightly swollen at apex and base. Male inflorescence mostly terminal, metabotryoid or botryoid, densely sericeous. Floral axes 4–6 mm long, articulate; prophylls usually present. Metaxyphylls caducous. Buds subglobular-ovoid. Calyx 2- or 3-partite to base at anthesis, serceous outside, glabrous inside. Petals 5(4), oblong-obovate, obtuse, ± recurved, 5–6 mm long, 2–3 mm wide, sericeous outside, velutinous inside. Disc undulate or lobed, 0.7–1 mm high, *c.* 2.5 mm diam., glabrous outside, villous inside. Stamens 25–30, connate to *c.* 0.5 mm above top of disc, free portion of filaments 1.5–2.5 mm long, apically glabrous, basally villous. Female inflorescence mostly terminal, botryoid, densely sericeous. Floral axes 3–14 mm long, not articulate; prophylls usually present, ± caducous. Metaxyphylls caducous. Buds ovoid. Calyx 2- or 3-partite to base at anthesis, sericeous outside, glabrous inside. Petals 5 or 6, oblong-obovate, obtuse, ± recurved, 7–8 mm long, 2–3 mm wide, sericeous outside, velutinous inside. Disc 0.6–0.8 mm high, 3 mm diam., undulate, glabrous. Ovary ovoid, 5(4)-locular, densely villous with antrorse hairs. Styles *c.* 0.8 mm long. Fruit ovoid-ellipsoid, 4- or 5-lobed when dry, 25 mm long, 20 mm wide; sarcocarp puberulous, fleshy, 6–8 mm thick, apricot or pink. Endocarp shortly beaked, bluntly 4- or 5-ridged at sutures, 13–15 mm wide; intersutural faces concave, smooth, 20–25 mm long, 7–10 mm wide. **Fig. 2.**

Queensland. COOK DISTRICT: Malanda, 30 Dec 1980, *Hinton* 138 (♀) (BRI); Gadgarra and Ghurka Pocket, 5 Sep 1957, *Smith* 10158 (♂) (BRI); S.F.R. 310 Windin L.A., 8 Oct 1973, *Hyland* 6914 (♀) (BRI), 6921 (♀) (BRI), 6 Dec 1973, *Hyland* 7156 (♀) (A, BRI), 7 Oct 1974, *Hyland* 7727 (♀) (BRI), 7728 (♂) (BRI); S.F.R. 310 Swipers L.A., 4 Dec 1961, *Volk* 2186, *Martin & Hyland* (♀) (BRI); Boonjee, near Malanda, 18 Sep 1929, *Kajewski* 1197 (A, BRI), 9 Oct 1929, *Kajewski* 1262 (♂) (A, BRI), Sep 1971, *Moriarty* 810 (♂) (BRI), 12 Aug 1947, *Smith* 3279 (♂) (BRI), in 1965, *Webb & Tracey* 6549 (BRI), Jan 1923, *White* (BRI); T.R. 1230, Boonjie L.A., 11 Jan 1983, *Gray* 2914 (♀) (BRI), 8 Oct 1973, *Hyland* 6913 (♂) (BRI); *c.* 4 miles past Lamins Hill on Ghurka Pocket Road, 21 Oct 1962, *Smith* 12086 (♂) (BRI); Glenallyn, *Hayes* (♀) (BRI); Foothills, Mt. Bartle Frere, 1 Oct 1929, *Kawjewski* 1253 (A, BRI); Tarzali, 7 Nov 1981, Tucker 22 (♂) (BRI), 24 Nov 1981, *Tucker* 77 (♀) (BRI); Keough's Scrub, Herberton, 20 Nov 1973, *Hartley 14013 & Hyland* (♀) (BRI); 14104 (♂), 22 Sep 1971, *Hyland* 5527 (♂) (A, BRI), 20 Nov 1973, *Hyland* 7110 (♀) (BRI); Kaban, *c.* 14.4 km N of Ravenshoe, 27 Sep 1950, *Smith* 467 (BRI).

Habitat: It occurs in complex mesophyll vine forest on the Atherton Tableland and adjacent foothills between 700–1100 m.

The following specimens from Papua New Guinea have a ± geniculate petiole similar to that found in *F. picrosperma, F. australis* and *F. oraria: L.S. Smith* N.G.F. 1030, *Streiman & Kairo* LAE 51548. This character alone precludes placement of them under *F. pancheri* as suggested by Airy Shaw (1974). These specimens almost certainly represent a further unnamed taxon. Additional collections are needed to confirm this. We have not seen the specimen *Stauffer & Sayers* 5608 grouped by Airy Shaw with *F. pancheri*.

3. Fontainea australis Jessup & Guymer, **sp. nov**.

Frutex vel arbor usque 5 m alta. Folia elliptica vel obovata vel oblanceolata, acuminata vel caudata. Glandes laminarum planae, ellipticae, submarginales c. 5–22 mm supra basin. Axes florales 7–12 mm longae in masculis, 15–22 mm longae in femineis. Ovarium villosum, fructus sarcocarpo molliter carnoso, 4–7 mm crasso, rubro praeditus. Endocarpus acute 3-porcatus secus suturas: superficies intersuturales convexae laeves, 17–18 mm longae, 12–13 mm latae. **Typus**: Oxley River (Middle Arm Creek), just beyond end of Butlers Road, NW of Tyalgum, 26 Dec 1981, *Jessup* 459 (♀) (BRI, holo; A, BRI, CANB, K, L, MEL, MO, NE, NOU, NSW, QRS, iso).

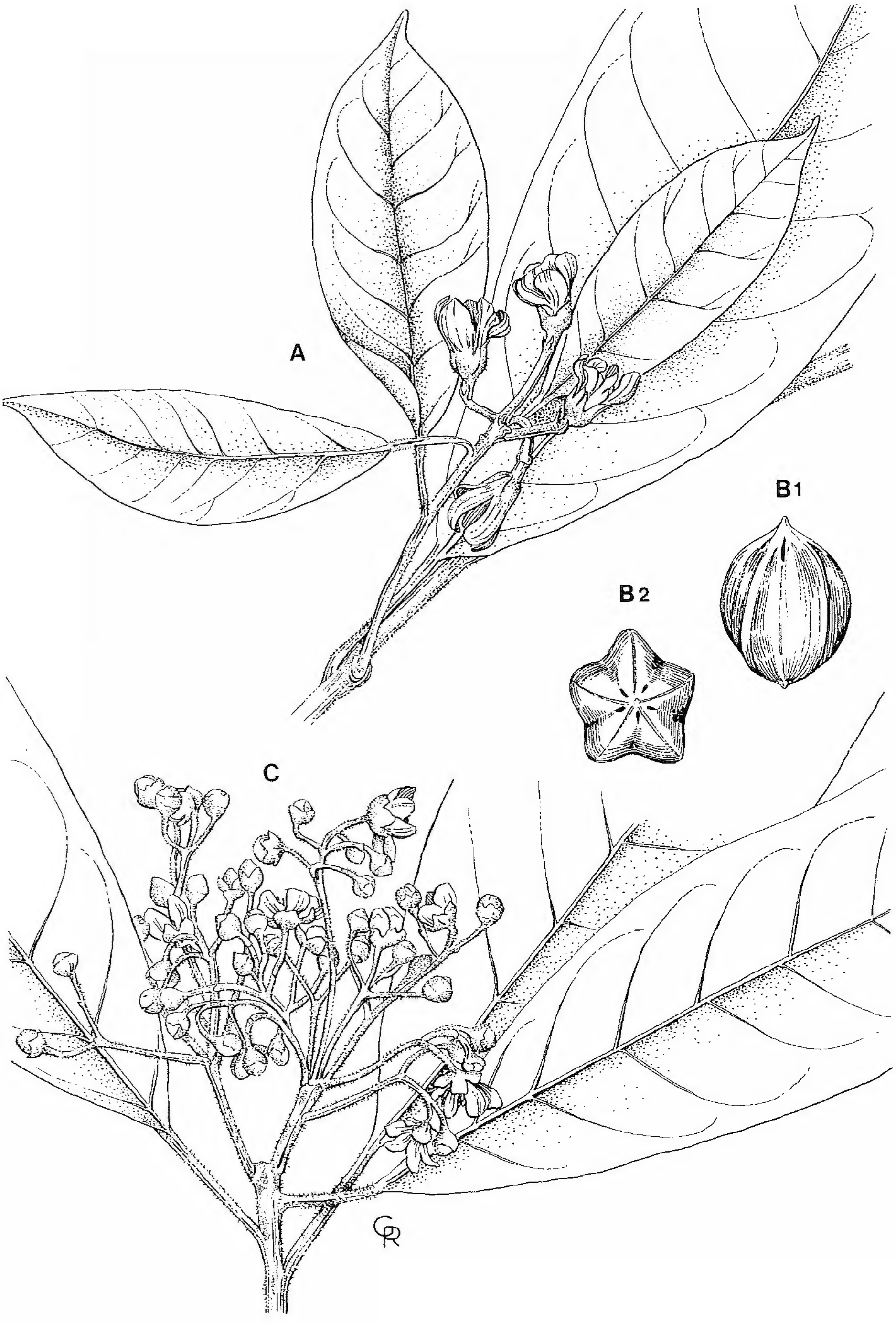


Fig. 2. *Fontainea picrosperma*: A. habit with female flowers (*Hyland* 7727) x 1. B. endocarp; B1, side view; B2, apical view (*White*, Jan 1923) x 1. C. habit with male flowers (*Hyland* 7728) x 1.

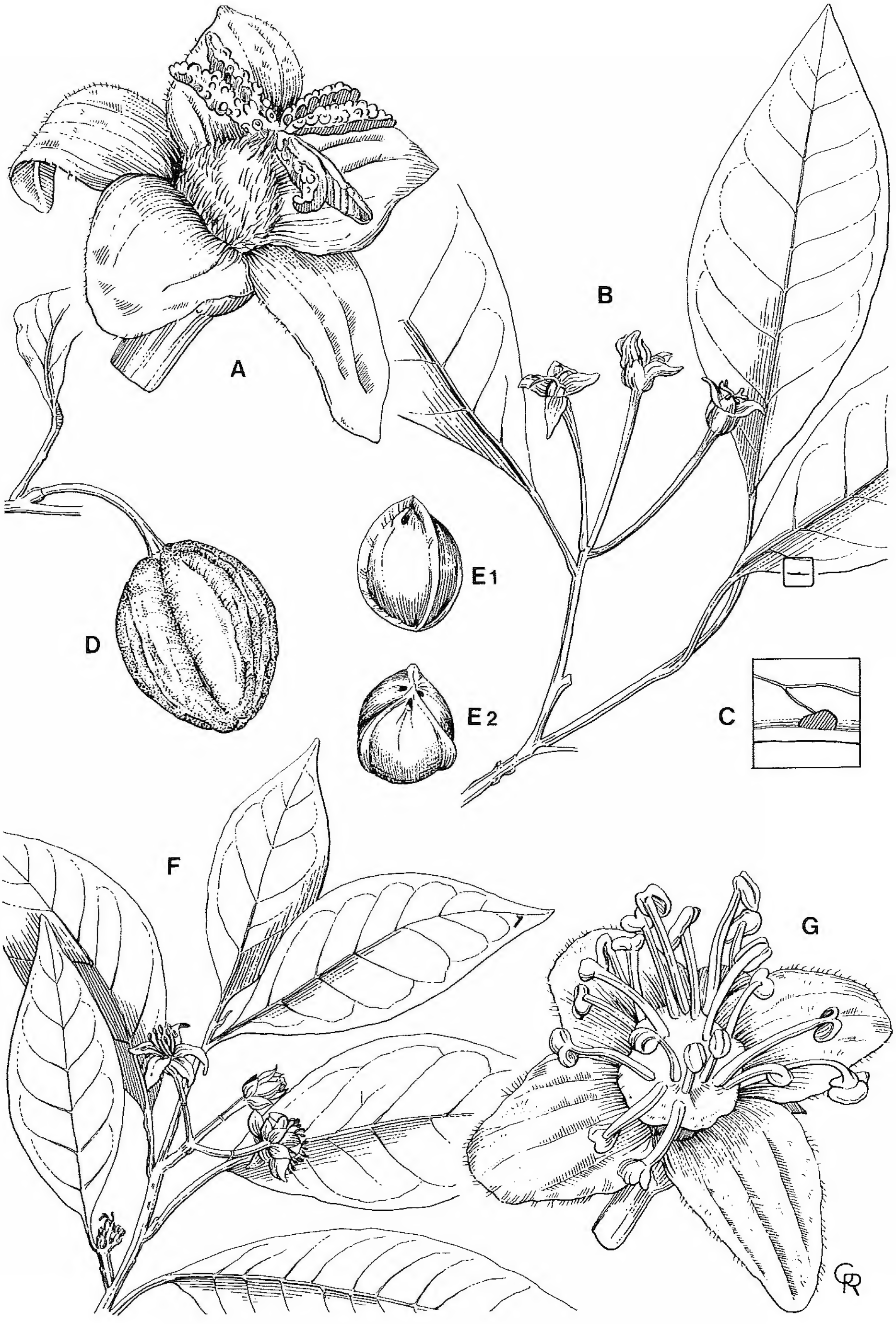


Fig. 3. *Fontainea australis*: A. female flower (*Jessup* 459) x 6. B. habit with female flowers (*Jessup* 459) x 1. C. detail of leaf gland (*Jessup* 459) x 6. D. habit with fruit (*Jessup* 459) x 1. E. endocarp; E1, sideview; E2, apical view (*Jessup* 459) x 1. F. habit with male flowers (*Jessup* 460) x 1. G. male flower (*Jessup* 460) x 6.

Shrub or tree to 5 m. Innovations appressed pubescent, glabrescent. Leaves elliptic, obovate or oblanceolate, acuminate to caudate, chartaceous; lamina (3-)6-9(-14) cm long, (1.5-)2-3.5(-5) cm wide, glabrous; base acute-cuneate; secondary veins 6-8(-9) pairs, frequently with intersecondaries; tertiary veins reticulate. Basilaminar glands flat, elliptic, submarginal, *c.* 5-22 mm above base of lamina. Petiole ± geniculate and slightly swollen at base and apex, shallowly channeled to flat above, 5-21 mm long. Male inflorescence a terminal botryoid or partially or wholly reduced to a metaxymonad. Floral axes 7-12 mm long, articulate; prophylls vestigal. Buds subglobular-ovoid. Calyx 3-4(-5)-partite, sparsely appressed puberulous outside, glabrous or with a few hairs inside. Petals 4 or 5, ovate, acute, ± recurved, 4-5 mm long, 2-4 mm wide, sericeous outside, velutinous inside. Disc undulate, 1-1.2 mm high, 2.8 mm diam., villous. Stamens 18-23, connate to 0.6 mm above top of disc; free portion of filaments 2.5-3.3 mm long, apically glabrous, basally villous. Female inflorescence a metaxymonad or reduced metaxytriad with one side-flower absent. Floral axes rarely articulate, very sparsely puberulous or glabrous, 15-22 mm long, metaxyphylls and pherophylls caducous. Buds ovoid. Calyx 2- or 3-partite, sparsely appressed puberulous outside, glabrous inside. Petals 4 or 5, ovate, 4-6 mm long, 3.2-4.8 mm wide, velutinous outside and inside. Disc entire, *c.* 0.6 mm high, 2.5 mm diam., pilose. Ovary ovoid, 3-locular, densely villous with antrorse hairs. Styles *c.* 0.5 mm long. Fruit broadly ovoid, 27 mm long, 23 mm wide; sarcocarp puberulous, 3-grooved near apex, soft-fleshy, 4-7 mm thick, red. Endocarp sharply 3-ridged at sutures, intersutural faces convex, smooth, 17-18 mm long, 12-13 mm wide. **Fig. 3.**

New South Wales: NORTH COAST: Oxley River (Middle Arm Creek), just beyond the end of Butler's Road, NW of Tyalgum, 26 Dec 1981, *Jessup,* 459 (♀) (BRI, CANB, K, L, MEL, MO, NE, NOU, NSW, QRS) & 460 (♂) (BRI, CANB, K, L, MEL, MO, NE, NOU, NSW, QRS), 7 Jul 1981, *Jessup* 410 *& Guymer* (♀) (BRI, CANB, K, L, MEL, NE, NOU, NSW).

Habitat: It is known only from a small population on private property adjacent to Limpinwood Nature Reserve, NW of Tyalgum, in complex notophyll vine forest on soil derived from basalt. **Map 2.**

This species is most closely related to *F. oraria* and differs by having a smooth endocarp, longer floral axes and more distal gland placement.

4. Fontainea oraria Jessup & Guymer, sp. nov.

Frutex vel arbor usque 5 m alta. Folia elliptica vel vix obovata, breve acuminata, interdum obtusa. Glandes laminarum planae ellipticae, submarginales, 0.5-4 mm supra basin. Axes florales 5-6 mm longae in masculis, 8-10 mm longae in femineis. Ovarium villosum. Fructus sarcocarpo molliter carnoso, 4-7 mm crasso, rubro praeditus. Endocarpus acute (2-)3-porcatus secus suturas; superficies intersuturales convexae rugosae, longitudinaliter sulcatae, 15-18 mm longae, 14-16 mm latae. **Typus**: 0.5 km W of Boulder Beach, just S of Lennox Head, 26 Dec 1982, *L. W. Jessup* 556 (♀) (BRI, holo; A, BRI, CANB, K, L, MEL, MO, NE, NOU, NSW, QRS, iso).

Shrub or tree to 5 m. Innovations appressed pubescent, glabrescent. Leaves elliptic or scarcely obovate, shortly acuminate, sometimes obtuse, chartaceous; lamina (3 –)6 – 9(– 13) cm long, (1.3-)2.5-4(-6) cm wide, glabrous; base obtuse or acute-cuneate, sometimes shortly attenuate; secondary veins 6-9 pairs, frequently with intersecondaries; tertiary veins reticulate. Basilaminar glands flat, elliptic, submarginal, 0.5-4 mm above base of lamina. Petiole ± geniculate and slightly swollen at base and apex, shallowly channeled to flat above, 3-25 mm long. Male inflorescence a terminal or axillary metabotryoid or botryoid, sometimes reduced to a metaxymonad. Prophylls and metaxyphylls vestigal or absent. Floral axes articulate, 5-6 mm long, sparsely appressed puberulous. Buds subglobular. Calyx 3-5-partite, sparsely appressed puberulous outside, glabrous inside. Petals 4 or 5, ovate, acute or obtuse, ± recurved, 4-4.5 mm long, 3-4 mm wide, sericeous outside, velutinous inside. Disc undulate, *c.* 1 mm high, 2.5 mm diam., villous. Stamens 20-24, connate to 0.4 mm above top of disc; free portion of filaments 1-2.5 mm long, apically glabrous, basally villous. Female inflorescence a terminal botryoid often reduced to 2 or 3 flowers. Prophylls and metaxyphylls vestigal or absent. Floral axes not articulate, 8-10 mm long, appressed puberulous. Buds ovoid. Calyx 4- or 5-partite, appressed puberulous outside, glabrous inside. Petals 4 or 5, ovate, 5.2-6 mm long, 3-3.5 mm wide, velutinous outside, sericeous inside near base, velutinous towards apex. Disc entire, *c.* 0.7 mm high, 3 mm diam., pilose. Ovary broadly ovoid to subglobular, (2-)3-locular, densely villous with antrorse hairs. Styles to 0.2 mm long. Fruit ±

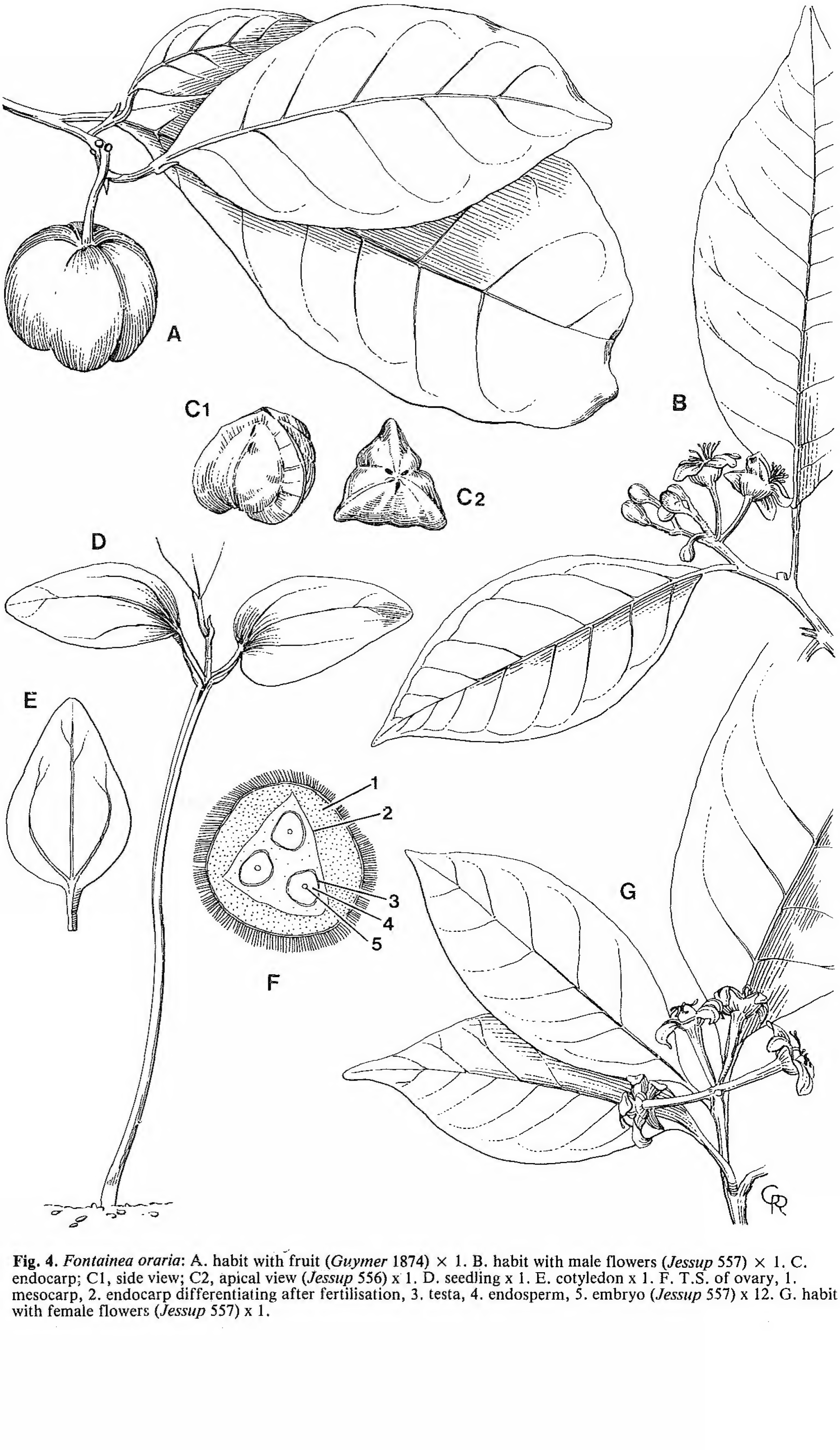


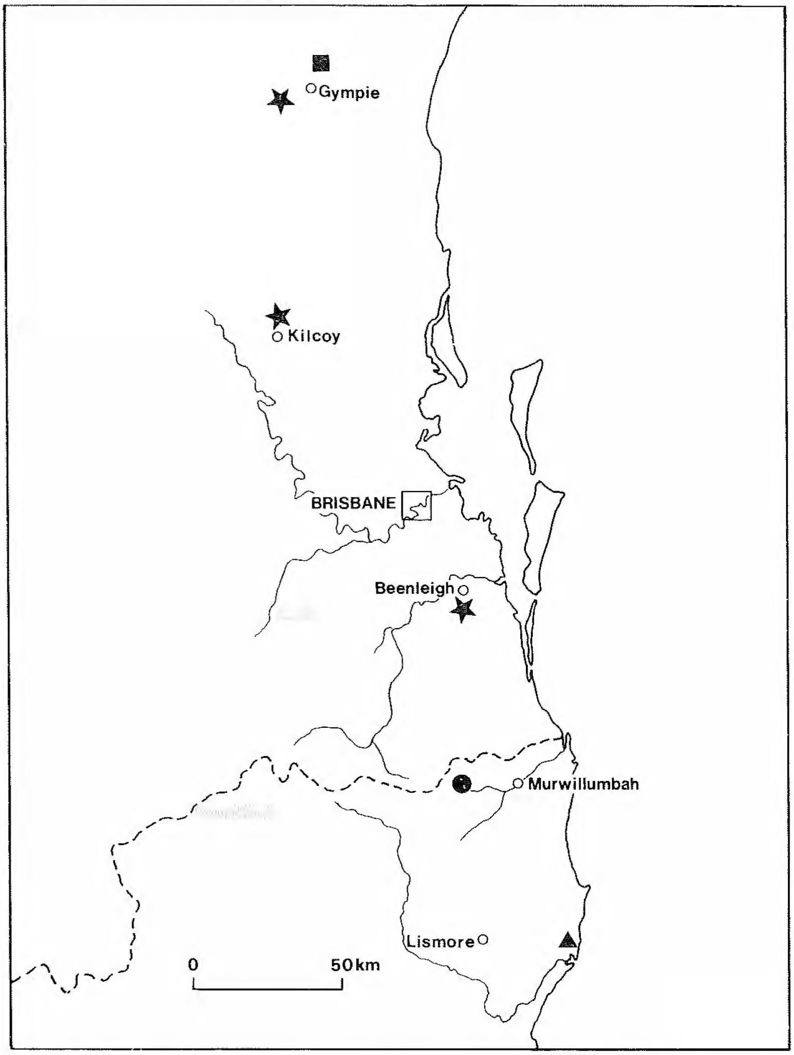
Fig. 4. *Fontainea oraria*: A. habit with fruit (*Guymer* 1874) × 1. B. habit with male flowers (*Jessup* 557) × 1. C. endocarp; C1, side view; C2, apical view (*Jessup* 556) x 1. D. seedling x 1. E. cotyledon x 1. F. T.S. of ovary, 1. mesocarp, 2. endocarp differentiating after fertilisation, 3. testa, 4. endosperm, 5. embryo (*Jessup* 557) x 12. G. habit with female flowers (*Jessup* 557) x 1.

globular or depressed globular, 18–22 mm long, 22–24 mm wide, puberulous, shallowly 6-grooved; sarcocarp soft-fleshy, 4–7 mm thick, red. Endocarp sharply (2–)3-ridged at sutures; intersutural faces convex, rugose, longitudinally and medially grooved, 15–18 mm long, 14–16 mm wide. **Fig. 4.**

New South Wales. NORTH COAST: 0.5 km W of Boulder Beach, just S of Lennox Head, 10 Nov 1983, *Guymer* 1871 (♀) (BRI, CANB, NE, NSW), 26 Dec 1982, *Jessup* 556 (♀) (A, BRI, CANB K, L, MEL, MO, NE, NOU, NSW QRS), 557 (♂) (BRI, NSW), 8 Nov 1982, *Jessup* 504 *& Guymer* (BRI, NSW, NE), *Jessup* 505 & *Guymer* (BRI, NSW, NE).

Habitat: It is known only from a very small population (*c.* ten mature plants) in a coastal form of notophyll vine forest dominated by *Cupaniopsis anacardioides, Guioa semiglauca* and *Alectryon coriaceus* on a hillside south of Lennox Head. The soil is derived from the abundant loose basaltic rock that occurs in the area. **Map 2.**

This species is most closely related to *F. australis* and differs by having a rugose and grooved endocarp, shorter floral axes and more proximal gland placement.



Map 2. Distribution of *Fontainea* in SE Queensland and NE New South Wales. *F. rostrata* (■); *F. australis* (●); *F. oraria* (▲); *F. venosa* (★).

5. **Fontainea venosa** Jessup & Guymer, **sp. nov.**

Frutex vel arbor usque 18 m alta. Folia obovata, rotunda apice. Venatio conspicua. Glandes laminarum leviter elevatae marginales, ad juncturam petioli et laminae. Ovarium glabrum. Fructus sarcocarpo solide carnoso, 2 mm crasso, aurantiaco praeditus. Endocarpus subglobulo-ellipsoideus; superficies intersuturales leviter complanatae igitur endocarpus valde obtuse (3–)4–5–angulatus ad suturas videtur, 15–24 mm longae, 12–17 mm latae, laeves foraminibus vascularibus dispersis instructae. **Typus:** Bahr's Hill, S of Beenleigh, 7 Aug 1984, *Williams* 84060 (♀) (BRI, holo; BRI, CANB, K, L, MO, NOU, NSW, iso).

Shrub or tree to 18 m. Innovations appressed pubescent, glabrescent. Leaves obovate to oblanceolate, mostly rounded at apex, subcoriaceous; lamina (2.5–)5–9.5(–14) cm long, (1.2–)2–4.5(–5.5) cm wide, glabrous: base narrowly cuneate to attentuate; venation conspicuous; secondary veins 7–9 pairs, sometimes with intersecondaries, tertiary and higher order venation reticulate. Basilaminar glands slightly raised, elliptic, marginal, at junction of lamina margin and petiole, rarely one or both glands absent. Petiole slightly swollen at base, shallowly channeled, sometimes flat above, 3–13 mm long. Male inflorescence terminal, botryoid, sometimes reduced. Floral axes not articulate, 1.5–3 mm long, pubescent; prophylls present or absent, sometimes connate with base of calyx. Metaxyphylls caducous. Buds subglobular. Calyx 3–5(–6)-partite, pubescent outside, glabrous inside. Petals 4–6, ovate, 3.5–4.5 mm long, 2.5–3 mm wide, sericeous outside, lanate inside. Disc undulate, c. 0.7 mm high, 2.2 mm diam., glabrous. Stamens 20–24, connate to 1 mm above top of disc; free portion of filaments 0.2–0.5 mm long, apically glabrous, basally villous. Female inforescence terminal, of 1–4 flowers. Floral axes not articulate, 1.5–2 mm long, prophylls sometimes present. Metaxyphylls caducous. Buds ovoid. Calyx 3–5–partite, appressed puberulous outside, glabrous inside. Petals 4 or 5, ovate, 3.5–4.5 mm long, 2.5–3 mm wide, sericeous outside, lanate inside. Disc undulate, 0.7 mm high, 2 mm diam., glabrous. Ovary subglobular-ovoid, (3–)4- or 5-locular, glabrous. Styles *c.* 0.5 mm long. Fruit subglobular-ellipsoid, 20–26 mm long, 17–26 mm wide; sarcocarp glabrous, firm-fleshy, 3–6 mm thick, yellow-orange. Endocarp subglobular-ellipsoid; intersutural faces slightly flattened hence endocarp appears very bluntly (3–)4- or 5-angled at sutures, 15–24 mm long, 12–17 mm wide, smooth with scattered vascular foramina. Subapical foramina slit-like or circular. **Fig. 5.**

Queensland. WIDE BAY DISTRICT: Forestry reserve 124, Glastonbury, Jan 1934, *Jennings* (♀) (BRI). MORETON DISTRICT: Bahr's Scrub, S of Beenleigh, 12 June 1983, Guymer 1861 (♂) (BRI, CANB, NSW); Bahr's Hill, S of Beenleigh 5 Apr 1984, *Jessup* 583 *& Guymer* (♀) (BRI); 7 Aug 1984, *Leiper* (♂) (BRI, K, L, MEL, NOU); 7 Aug 1984, *Williams* 84060 (♀) (BRI, CANB, K., L, MO, NOU, NSW); Logan, Mar 1898, *F. W. Peek* (♀) (BRI); without date, *Eaves* (BRI): *Kilcoy*, without collector and date (♂) (MEL).

Habitat: It occurs in notophyll vine forest with a mean annual rainfall of 1000–1100 mm on soils derived from and containing abundant andesitic rocks. We know of only one population of this taxon, SW of Beenleigh *c.* 30 km SE of Brisbane. The populations from Kilcoy and Glastonbury have not been relocated. **Map 2.**

This species differs from *F. pancheri* by its subglobular or obtusely 4- or 5-angled endocarp and few scattered foramina. It differs from all other species by the glabrous ovary.

Bentham (1873) referred the Kilcoy specimen to *Baloghia pancheri* as "a single specimen agreeing precisely with a specimen in Herb. Hook. from New Caledonia". Bailey (1902) followed Bentham's determination when he referred the Logan specimens to this species. In the absence of fruit *F. pancheri* and *F. venosa* are indeed very similar, and we believe, closely related.

6. **Fontainea pancheri** (Baillon) Heckel, Étude sur le *Fontainea pancheri*. Thése Faculté de Médecine de Montpellier (1870). Based on *Baloghia pancheri* Baillon, Adansonia 2: 214 (1861). **Syntypes:** New Caledonia, *Pancher* 722; *Vieillard* 203, 204, 7; *Deplanche* 487 (all P).

Codiaeum pancheri (Ballion) Muell. Arg., in DC. Prod. 15(2): 1117 (1866).

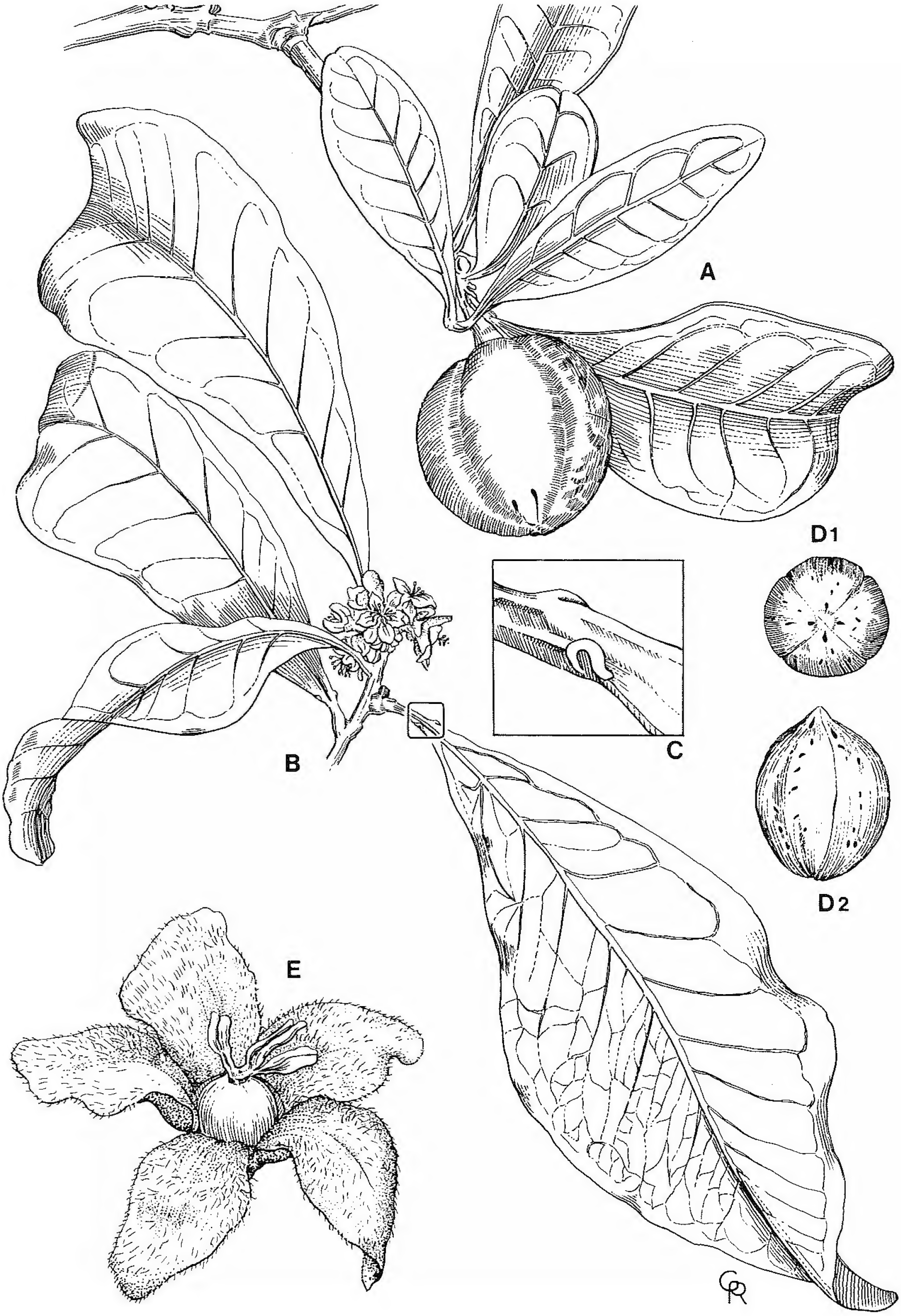


Fig. 5. *Fontainea venosa*: A. habit with fruit (*Williams* 84060) x 1. B. habit with male flowers (*Guymer* 1861) x 1. C. detail of leaf glands (*Guymer* 1861) x 6. D. endocarp; D1, apical view; D2, side view (*Jessup* 583 *& Guymer*) x 1. E. female flower (*Jessup* 583 *& Guymer*) x 6.

We have ommitted a description of *F. pancheri* in this paper because we have identified three taxa amongst the specimens seen from New Caledonia and Vanuatu. These specimens exhibit a number of differences in the inflorescence and structure of the endocarp. It appears that more than one of these taxa are represented in the five syntypes of *F. pancheri*. We have illustrated the endocarps from representative specimens.

In taxon 1 the endocarp of *Suprin* 450 (NOU) from Koumac is ridged along the sutures (Fig. 6C, D). *Kajewski* 906 (A, BRI) from Aneityum Island, Vanuatu, is similar but has an apical beak. Taxon 1 is monoecious.

In taxon 2 the endocarp of *McKee* 40251 (BRI) from Baie Maa is ridged between the sutures as well as along the sutures (Fig. 6B).

In taxon 3 the endocarp of *Schmid* 1267 (NOU) from Lifou is prominently ridged only between the sutures (Fig. 6A).

Further collections should be examined before formal description of any of these taxa is published.

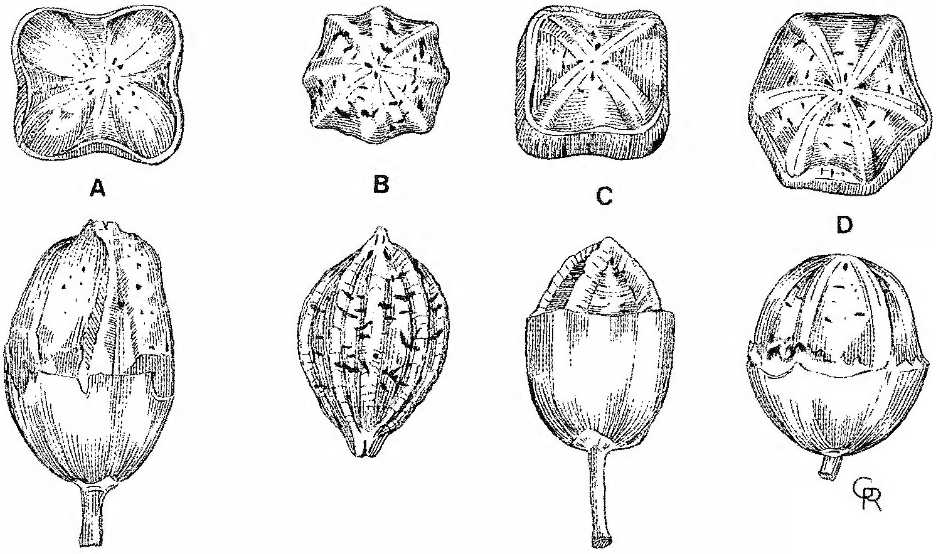


Fig. 6. *Fontainea pancheri* s.lat. endocarps: upper row, apical view; lower row, side view. A. (*Schmid* 1267). B. (*McKee* 40251). C. 4-merous; D. 6-merous (C & D from *Suprin* 450).

Conservation Status

The four new species all have restricted distributions and are not known to occur within national parks or other proclaimed reserves. We would place *F. australis* and *F. oraria* under category 2E of Leigh, Briggs and Hartley (1981), and *F. rostrata* and *F. venosa* under category 2V.

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References

AIRY SHAW, H.K. 1974. The genus *Fontainea* Heckel in New Guinea. *Kew Bulletin* 29(2): 326-328.

AIRY SHAW, H.K. 1980a. The Euphorbiaceae of New Guinea. *Kew Bulletin Additional Series* VIII.

AIRY SHAW, H.K. 1980b. A partial synopsis of the Euphorbiaceae — Platylobeae of Australia (excluding *Phyllanthus, Euphorbia* and *Calycopeplus*). *Kew Bulletin* 35(3): 632–633.

BAILEY, F.M. 1902. *Fontainea* in The Queensland Flora 5: 1439–1440. Brisbane: Govt. Printer.

BENTHAM, G. 1873. *Baloghia* in Flora Australiensis 6: 149. London: Reeve & Co.

BRIGGS, B.G. & JOHNSON, L.A.S. 1979. Evolution in the Myrtaceae — evidence from inflorescence structure. *Proceedings of the Linnean Society of New South Wales* 102(4): 157–256.

HECKEL, E. 1870. Étude sur la *Fontainea pancheri*. Thése Faculté de Médecine de Montpellier.

HICKEY, L.J. 1973. Classification of the architecture of dicotyledonous leaves. *American Journal of Botany* 60(1): 17–33.

LEIGH, J., BRIGGS, J. & HARTLEY, W. 1981. Rare or Threatened Australian Plants. Australian National Parks and Wildlife Service Special Publication No. 7.

WEBB, L.J. 1978. A general classification of Australian rainforests. *Australian Plants* 9(76): 349–363.